

**REMARKS**

In the Office Action, dated April 25, 2001, the Examiner states that Claims 1-31 are pending, Claims 21-31 are withdrawn from consideration, and Claims 1-20 are rejected. By the present Amendment, Applicants amend the specification, the claims, and the drawings.

In the Office Action, the Patent Office objects to Figure 4 because the selected distance L12 improperly denotes the space between branches 43b instead of second parts 46b. The Applicants have amended Figure 4 to correct this error. ou ✓

In the Office Action, the Patent Office objects to Claims 1 and 9 because of the following informality: the phrase "the polarizing plate an the upper substrate". The Applicants have amended this phrase to read --the polarizing plate and the upper substrate--, as the Examiner suggested. ou ✓

In the Office Action, the Patent Office rejects Claims 1, 9 and 14 under 35 U.S.C. §112, second paragraph. The Applicants have amended Claims 1 and 9 to recite -- a quarter wave plate is sandwiched between the reflecting plate and the lower substrate--, as suggested by the Examiner. Claim 14 has been amended, replacing "lengths" with --dimensions--, as suggested by the Examiner. ou ✓

In the Office Action, the Patent Office makes several 35 U.S.C. §103(a) rejections to the claims. In paragraph 7 of the Office Action, Claims 1-3 are rejected under 35 U.S.C. §103(a) as being unpatentable over Applicant's Prior Art in view of *Ota et al.* (US 5,831,707) and *Channin* (US 4,385,805). Applicants disagree with this rejection and contend that *Channin* does not teach the features of the claims.

*Channin* (col. 3, lines 23-28) discloses that the thickness of the liquid crystal layer is about 12 to 50 microns, and the spacing between the electrodes is about 25 microns. This disclosure does not teach that the distance between the substrates is greater in length than the distance between the counter and pixel electrodes, as claimed in Claim 1 of the present invention. Instead it discloses a workable range in which the distance between the substrates may be greater or lesser in length than the distance between the electrodes. Therefore, the present invention claims a range within the broader range disclosed *Channin*. ) ①

Where the claims in an application provide a range that is within or overlaps a range disclosed in the prior art, the Applicant may overcome the prima facie case of obviousness by showing improved performance or unexpected results within the

narrower range which is claimed. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ 2d 1934, 1936 (Fed. Cir. 1990).

*Channin* does not teach that the purpose of making the distance between the substrates greater than the distance between the electrodes is so that a plurality of fringe fields may be formed on both sides of the electrodes sufficient enough to drive all liquid crystal molecules in the upper portions of the electrodes. By doing this, the transmittance of the reflective LCD of the Applicant's invention is greatly improved. Also, by doing this, an enhanced aperture ratio is obtained, the response time is greatly improved, a lower threshold value is obtained, a relatively wider view angle can be obtained, and the size of the LCD can be reduced. These improved performance features are disclosed in the specification of the application. See page 19 20 of the application.

Therefore, a showing of improved performance/unexpected results has been shown by using the narrower range of crystal layer thickness in relation to the spacing distance of the electrodes in the present invention. For this reason, *Channin* may not be used as a reference to show obviousness under 35 U.S.C. §103.

In paragraph 8 of the Office Action, Claims 1-3 are again rejected under §103 as unpatentable over Applicant's Prior Art in view of *Ota et al.* and *Hiroshi* (US 5,995,186). The Applicants disagree with this rejection and assert that the combination of the prior art and the references do not teach the invention as claimed as a whole.

It is submitted that the question under 35 U.S.C. §103(a) is whether the totality of the art would collectively suggest the claimed invention to one of ordinary skill in the art. *In re Simon*, 461 F.2d 1387, 174 USPQ 114 (CCPA 1972).

That elements, even distinguishing elements, are disclosed in the art is alone insufficient. It is common to find elements somewhere in the art. Moreover, most, if not all, elements perform their ordained and expected functions. The test is whether the invention as a whole, in light of all the teachings of the references in their entireties, would have been obvious to one of ordinary skill in the art at the time the invention was made. *Connell V. Sears, Roebuck & Co.*, 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983).

It is insufficient that the art disclosed components of Applicants' claimed invention, either separately or used in other combinations. A teaching, suggestion, or incentive must exist to make the combination made by the inventor. *Interconnect Planning Corp. V. Feil*, 774 F. 2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1988).

Both the §103 rejections to Claims 1-3, in paragraphs 7 and 8 of the Office Action, combine the prior art disclosed in the application and two other prior art references. The Examiner, in making these rejections, has merely taken the certain elements from various applications and pieced them together to cover all the elements set out in the claims. The Applicants assert that each claim must be examined as a whole. The claims should not be used as an "instruction manual" to combine elements present in the prior, which added together include all the elements in the claims. The question which must be answered is whether it would have been obvious to combine the references without having access to the application under examination. The Applicant's assert that the answer to this question is no.

Although *Graham v. John Deere Co.*, 383 US at 17, 148 USPQ at 476, requires that certain factual inquiries, among the differences between the prior art and the claimed invention, be conducted to support a determination of the issue of obviousness, the actual determination of the issue requires an evaluation in light of the findings in those inquiries of the obviousness of the claimed invention as a whole, not merely the differences between the claimed invention and the prior art. *Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 221 USPQ 1025, 1033 (Fed. Cir. 1984). See also *Fromson v. Advance Plate, Inc.*, 755 F.2d 1549, 225 USPQ 26, 31 (Fed. Cir. 1985).

In both the rejections of Claims 1-3, in paragraphs 7 and 8 of the Office Action, the Examiner merely combines all the elements in the claims from the prior art and proclaims that it therefore would have been obvious to a person of ordinary skill in the art to combine these references.

It is the duty of the Examiner to explain why the combination of the reference teachings is proper. Absent such reasons or incentives, the teachings of the references are not combinable. *Ex parte Skinner*, 2 USPQ 2d 1788, 1790 (B.P.A.I. 1987).

Since the Examiner has failed show where in the references such a combination is taught, or provide a showing why a combination of the prior art elements would have been obvious to a person of ordinary skill in the art, prima facie obviousness has not been established as required under 35 U.S.C. §103, and the rejection to Claims 1-3 has been overcome. Notice to that effect is requested.

Furthermore, since Claims 2-8 depend directly or indirectly from Claim 1, the further rejections under §103 are also overcome. ) e (1)

In paragraph 12 of the Office Action, the Patent Office also rejects Claims 9-10 and 15 under 35 USC §103(a) as being unpatentable over Applicant's Prior Art in view of *Ota et al.* and *Channin*. The same arguments given against the §103 rejections in paragraphs 7 and 8 apply here as well. Therefore the Patent Office has failed to establish a prima facie case of obviousness under §103. The rejections to Claims 9-10 and 15 have been overcome and should be withdrawn. Notice to that effect is requested. Since Claims 10-20 depend directly or indirectly from Claim 9, the further rejections to these claims under §103 have also been overcome. Some (1)

In paragraph 9 of the Office Action, the Patent Office rejects Claims 4 and 16 under §103(a) as being unpatentable over Applicant's Prior Art in view of *Ota et al.* and *Channin* as applied to Claims 1-3, and further in view of *Kondo et al.* (US 6,124,915). Here again the Applicants assert that the Examiner has merely combined elements from the prior art without any explanation as to how the combination of these elements, as taught or suggested within the references, makes the present invention obvious under §103. Without any teaching or suggestion that the combination, cooperation or interaction of these references is obvious, or a showing that a person of ordinary skill in the art would have found the combination obvious, prima facie obviousness has not been established by the Patent Office as required under 35 U.S.C. §103(a), and the above rejection has been overcome. Notice to that effect is requested.

This same argument, that there is no showing of obviousness to a person of ordinary skill in the art by the Examiner or a teaching or suggestion within the references that the combination of the cited prior art references is obvious, can also be applied to the rejections under 35 U.S.C. §103(a) to Claims 5-7 and 17-19 in paragraph 10 of the Office Action, Claims 8 and 20 in paragraph 11, and Claims 9-10 and 15 in paragraph 13.

In paragraph 14 of the Office Action, Claims 11-14 are rejected under 35 U.S.C. §103(a) as being unpatentable over Applicant's Prior Art in view of *Ota et al.* and *Hiroshi* as applied to Claim 9, and further in view of *Lee et al.* (US 5,886,762). In addition to the previous arguments that it is not obvious to combine these references, the Applicants assert that *Lee et al.* is not a proper prior art reference under §103.

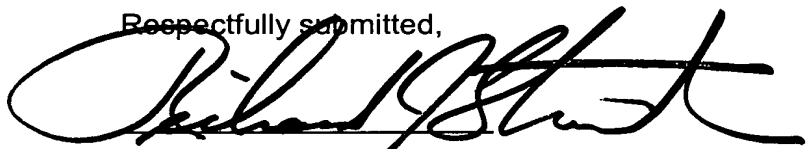
Hyundai Electronics Industries Co. is a common-assignee of the *Lee et al.* patent and the present application. Additionally, there are two common-inventors between the patent and the present application. While *Lee et al.* would be a proper prior art reference under 35 U.S.C. §102(e), 35 U.S.C. §103(c) states that:

Subject matter developed by another person, which qualifies as prior art only under subsection (e), (f) and (g) of subsection 102 of this title, shall not preclude patentability under this section where the subject and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Therefore, under §103(c) the obviousness rejection under §103(a) in paragraph 14 of the office Action is not proper and the rejection is overcome. Notice to that effect is requested.

In light of the foregoing response, all the outstanding objections and rejections have been overcome. Applicants respectfully submit that this application should now be in better condition for allowance and respectfully requests favorable consideration.

Respectfully submitted,



Attorney for Applicants  
Richard J. Streit, Reg. No. 25765  
c/o Ladas & Parry  
224 South Michigan Avenue  
Chicago, Illinois 60604  
(312) 427-1300

August 6, 2001

Date

filed  
before 11/27/99



DOCKET: CU-1962

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICANT: In Cheol PARK et al )  
SERIAL NO: 09/345,270 ) Group Art Unit: 2871  
FILED: June 30, 1999 ) Examiner: Q. VU  
TITLE: REFLECTIVE LIQUID CRYSTAL DISPLAY OF HIGH APERTURE  
RATIO, HIGH TRANSMITTANCE AND WIDE VIEWING ANGLE

THE ASSISTANT COMMISSIONER FOR PATENTS  
Washington, D.C. 20231

**MARKED VERSION OF AMENDED SPECIFICATION PARAGRAPHS**

Page 5, second paragraph to Page 7, first partial paragraph

To accomplish the foregoing object, the present invention provides a  
reflective LCD comprising:

- a lower substrate and an upper substrate opposed with a selected distance;
- a liquid crystal layer sandwiched between the lower and the upper substrates and comprising a plurality of liquid crystal molecules;
- a gate bus line and a data bus line formed on the lower substrate to define a pixel;

- a counter electrode and a pixel electrode formed at an inner surface of the lower substrate wherein both electrodes are formed with a selected distance and width so that most of the liquid crystal molecules in upper portions of those electrodes are sufficiently driven by forming a fringe field between said counter and pixel electrodes;

- a thin film transistor provided adjacent to an intersection of the gate bus line and the data bus line and transmitting a signal of the data bus line into the pixel electrode when the gate bus line is selected;

- a polarizing plate disposed at an outer surface of the upper substrate;
- a reflecting plate disposed at an outer surface of the lower substrate; and
- a quarter wave plate sandwiched between the **[quarter wave] reflecting** plate and the lower substrate, or between the polarizing plate and the upper substrate,

RECEIVED  
AUG 13 2001  
TECHNOLOGY CENTER 28000

wherein both counter and pixel electrodes are made of a transparent conductor,

wherein a distance between the upper and lower substrates is greater in length than the distance between the counter and pixel electrodes.

The present invention further provides a reflective LCD comprising:

a lower substrate and an upper substrate opposed with a selected distance;

a liquid crystal layer sandwiched between the lower and the upper substrates and comprising a plurality of liquid crystal molecules;

a gate bus line and a data bus line formed on the lower substrate to define a pixel;

a counter electrode formed at each pixel of the lower substrate, transmitted with the common signal and having a plurality of branches diverged in parallel with the data bus line and at least a bar for connecting the branches, wherein the respective branches have a first width and they are spaced with a second distance;

a pixel electrode having a plurality of strips formed between the respective branches of the counter electrode, having a second width, and spaced apart by a third distance, and at least a bar for connecting the strips;

a thin film transistor provided adjacent to an intersection of the gate bus line and the data bus line and transmitting a signal of the data bus line into the pixel electrode when the gate bus line is selected;

a polarizing plate disposed at an outer surface of the upper substrate;

a reflecting plate disposed at an outer surface of the lower substrate; and

a quarter wave plate sandwiched between the **[quarter wave] reflecting** plate and the lower substrate, or between the polarizing plate and the upper substrate,

wherein both counter and pixel electrodes are made of a transparent conductor,

wherein a distance between the upper and lower substrates is greater in length than the distance between the branch of the counter electrode and the strip of the pixel electrode,

wherein the first and second widths are set such that the liquid crystal molecules in upper portions of the branch of the counter electrode and the strip of the pixel electrode are aligned by the electric field between adjacent branches and strips.

Moreover, the present invention provides a reflective LCD comprising:

a lower substrate and an upper substrate opposed with a selected distance;

a liquid crystal layer sandwiched between the lower and the upper substrates and comprising a plurality of liquid crystal molecules;

a gate bus line and a data bus line formed on the lower substrate to define a pixel;

a counter electrode formed at each pixel of the lower substrate, transmitted with a common signal and shaped of a plate;

a pixel electrode formed over the counter electrode and having a plurality of strips, wherein the strip has a selected width and spaced from each other by a selected distance;

a thin film transistor provided adjacent to an intersection of the gate bus line and the data bus line and transmitting a signal of the data bus line into the pixel electrode when the gate bus line is selected;

a polarizing plate disposed at an outer surface of the upper substrate;

a reflecting plate disposed at an outer surface of the lower substrate; and

a quarter wave plate sandwiched between the **[quarter wave] reflecting** plate and the lower substrate, or between the polarizing plate and the upper substrate,

wherein both counter and pixel electrodes are made of a transparent conductor,

wherein a distance between the upper and lower substrates is greater in length than the distance between the counter electrode and the pixel electrode,

wherein a width of the strip of the pixel electrode and a width of the counter electrode disposed between the strips are set such that the liquid crystal molecules in upper portions of the counter electrode disposed between the strips and the strip



of the pixel electrode are all aligned by the electric field between adjacent branches and strips.